

2. Operating Instructions

There are a few assumptions we make about crew operations. We assume crew will usually set up the video system as follows: initial placement of four video recorders, and experiment use of at least one recorder, one monitor, one camera, the touchpad, the microphone/headset and the footswitch.

To optimize usage, two monitors are suggested for use: one for displaying the GUI and the other to view the ongoing experiment. Detailed operations of set up with cabling and connections is to be found below, broken out by type of hardware, and a description of the Video Drawer Front Panel.

2.1 Operations on the Front Panel

In Figure 20 the layout of the front-panel is depicted.

On the front-panel, several switches, LED's and connectors are located. The switches are protected by switch-guards to prevent unintended operations. Most switches on the front-panel are momentary switches. After activating, the lever returns to its base position. The position of the lever does not reflect a status. For that purpose, LEDs are used. Green LEDs are usual, Yellow LEDs indicate "attention needed".

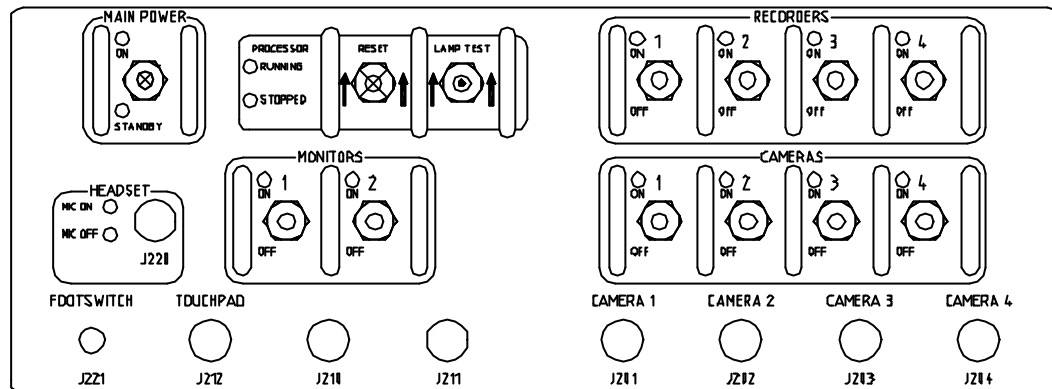
Figure 20: Video Drawer Front Panel







2.1.1 Momentary Switches on the VD

The varying types of switches are described in the legend next to the VD Drawing below.

Figure 21: VD Front Panel Momentary Switch Drawing



-  **MOMENTARY TOGGLE SWITCH**
(MOM) - OFF - (MOM)
TYPE: 12147AD2
-  **MOMENTARY TOGGLE SWITCH**
OFF - (MOM)
TYPE: 12145AD2
-  **MOMENTARY TOGGLE SWITCH**
LEVER LOCK, (MOM) - OFF - (MOM)
TYPE: 12147AD2-5V
-  **MOMENTARY TOGGLE SWITCH**
LEVER LOCK, OFF - (MOM)
TYPE: 12145AD2-13V/1

2.1.2 Switching Main Power

After connecting the data/power connector at the back of the VD and switching the Circuit Breaker switch inside the VD, the VD Main Power Panel is ready to be switched on

The switch indicated by “MAIN POWER” controls the mode of the VD. Two LEDs accompany the switch. The upper green LED indicates the “ON” mode. The lower green LED indicates “STANDBY”. The switch is a lever-locked switch; thus the lever must be pulled out before it can be moved up- or downward. This is an extra precaution for unintended use of the switch.

In the STANDBY mode, the VD is ready for use, but the power supplied to cameras, recorders and monitors is off. However, remote control, including a command to go to “ON” mode, is still possible.

When the Processor "Running" green LED is ON, this indicates that the VD is ready for receiving commands from the RC or the GUI. It also indicates that housekeeping data is sent to the RC. If there is a problem, the Processor Stopped yellow LED is ON, while the green Running LED is OFF.

There is one condition that will force the VD into "STANDBY" mode: overheat detection. There are two OHD limits for the VD. If the lower limit is reached, the VD is forced into "STANDBY" mode. In this case, activating "ON" mode using the switch will not have any result. When the temperature becomes acceptable again, it will be allowed again. The upper limit will cut off all power to the VD.

When the VD returns to "STANDBY" mode, all camera, recorder and monitor powers are reset to the "OFF" position.

2.1.3 Resetting the VD

The "RESET" switch, pulled out and pushed upwards, resets the VCU of the VD.

Hardware checks if the software is functioning. If no signal is received from the software, the yellow stopped LED will burn. If the check succeeds, the Processor green Running LED is ON. Otherwise, the Processor yellow Stopped LED is ON and the green Running LED is OFF. The fact that the yellow LED is ON does not necessarily indicate a failure of the VCU. When the VCU is restarting the yellow LED will also be ON.

One of the reasons the user might push the reset button is if a touchpad is connected after power up. This situation occurs when the touchpad is disconnected and connected to another monitor.

2.1.4 Performing a Lamp Test

The switch indicated by "LAMP TEST" checks all LEDs on the front-panel. By moving the lever upwards the lamp-test is activated and all LEDs on the front-panel should light up. This test can be performed while the VD Panel is in Standby Mode, as well as with Main Power On.

2.1.5 Activating the Microphone on the Headset

The microphone is only controlled by the hardware. Two switches control the microphone of the VD. There is an On switch on the headset control unit (HCU) itself, located on a small box attached to the unit. There is also an Off switch on the HCU. Also on the on the HCU is a VOX position, which controls the microphone by working as if an On switch (no voice activation available.)

The second switch that controls the microphone is the footswitch. Activating the footswitch will change the state of the microphone. The green MIC ON LED reflects the Microphone ON status. The MIC OFF

LED reflects the OFF status. When the green MIC ON LED is ON, any audio signal from the headset will record on any and all recorders that are set to record.

2.1.6 Powering the Recorders

There are four switches to activate all the four video Recorders, one switch per Recorder. By moving the lever up, the power is activated, the green LED is ON, and it is ready to receive commands. If the VD is in “STANDBY” mode, there will be no result. Moving the lever down switches the power off and the green LED off. Note: upon installation, the ON/OFF button on the recorder must be pushed to ON.

2.1.7 Powering the Monitors

There are two switches to activate each of the two monitors. By moving a lever up, the power is activated, and the green LED is ON, and the GUI will appear. If the Main Power switch on the VD Panel is in “STANDBY” mode, the monitors will be off and nothing will appear on the screen. Moving a lever down switches the power off and the green LED OFF.

2.1.8 Powering the Cameras

There are four switches to activate each of the four cameras. By moving a lever up, the power is activated and the green LED is ON. Main Power on VD must be on. If the VD is in “STANDBY” mode, the cameras will be off. Moving a lever down switches the power off and the green LED off.

2.1.9 Connecting the Headset

Please connect the Headset to connector J220 on the VD Front Panel. It is suggested to turn off the Microphone before disconnecting the Headset.

2.1.10 Connecting the Footswitch

It is recommended to connect the footswitch to the Front Panel of the VD connector J221 before powering the VD.

2.1.11 Connecting the Touch-pad

The touch pad and its 1m cable can be connected directly to the front panel of the VD (J212) or it can first be connected to one of the two monitors. (To be used inside or outside the WV.) The touch-pad should be

connected to the VD or to a monitor before the VD Main Power is powered.

It is suggested not to connect the touch-pad when the VD is powered. When the touch-pad is not connected first to the VD or monitor before start up, the user interface misses the input device and it will not be commandable. The status will still be visible on the GUI, but changing windows and activating commands is not possible. Remote control capabilities are not affected when the touch-pad is missing. If, by mistake the touchpad is connected after the experiment is started, please use the reset switch to reset the GUI.

Figure 22: Touchpad



2.1.12 Connecting a Monitor

Each monitor has an adherent 3-meter length of pigtail cable and connector that can be attached to either, J210 and J211 connectors on the VD Front Panel. Before a monitor is connected to the VD, the operator must check if the applicable monitor is switched off (LED on the VD Front Panel is OFF). The user is urged not to connect a monitor if the Monitor Switch power is on (Led On).

The monitors are used inside or outside the WV. For use inside the WV, attach the monitor's cable to the inside of the video feed-through port, and then connect a cable (label TBD) from the outside of the video feedthrough to the VD Front Panel.

The monitor has a pigtail cable attached underneath that will connect to the VD Front Panel. Also underneath a connector is provided to adapt the touchpad.

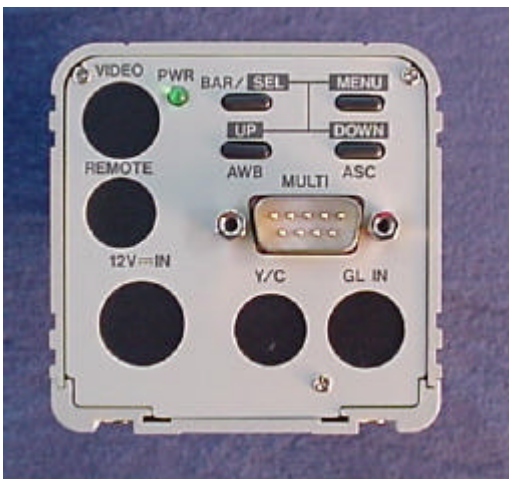
2.1.13 Connecting a Camera

Cameras are delivered with a permanently connected cable (pigtail). When connecting a camera to the VD Panel, the applicable Camera Switch should be switched off (LED OFF). The VD Main Power may be On or Off. The cameras are interchangeable and can be connected to any of the four camera connectors:

Camera 1	Camera 2	Camera 3	Camera 4
J201	J202	J203	J204

Use the video feed-through ports to allow use of cameras inside the WV at any given time. If using cameras inside the WV, attach the provided connector cable (label TBD) from the VD Panel Camera connector to the video feed-through connector plug and connect the camera to the inside of the feed-through port.

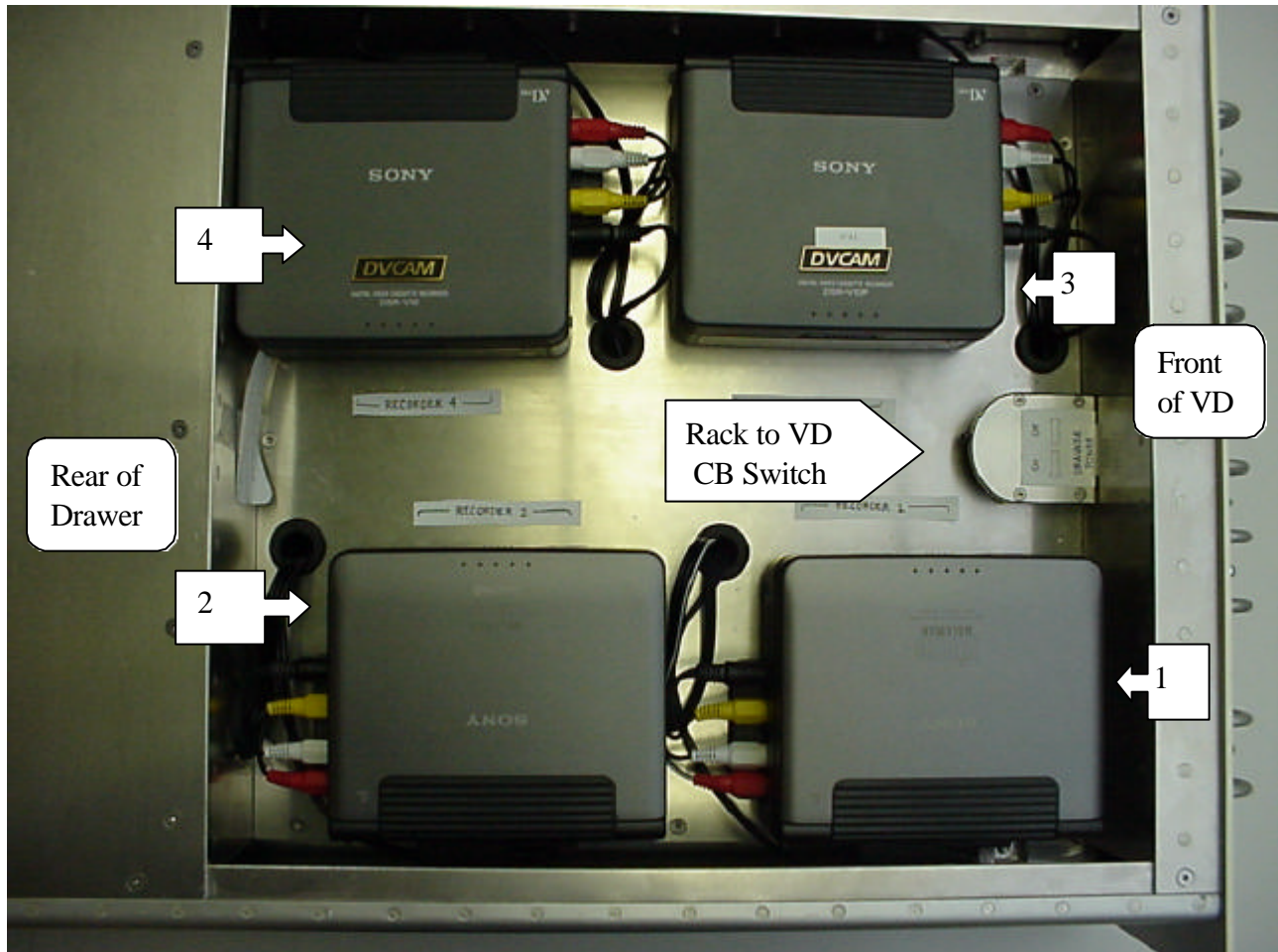
Figure 23: The camera's backside, without permanent pigtail.



2.1.14 Connecting a Video Recorder inside the drawer

Each recorder looks identical. Each recorder is interchangeably placed inside the VD on orbit. The recorders are secured using Velcro strips on the bottom to one of four labeled positions. Positions 1 and 3 are at the front of the drawer, left and right respectively. Position 2 and 4 are at the back of the drawer, left and right respectively. Either type of recorder can be used in any position. Refer to Figure 24: Video Recorders in VD.

Figure 24: Video Recorders in VD



On the back of the recorders, the power connector slides into place. It is released by using a finger to push the release to the left. See figure below.

Figure 25: Video Recorder Power Supply



Figure 26: Side view of Recorder



The right side of each recorder has a hinged door that opens with one pull of a fingertip to reveal the S video connector, the Video (Yellow) connector, the Audio Left (White) connector and Audio Right (Red) connector, the green Earphone connector and the blue Lanc connector. Each recorder's connectors connect with a single pigtail cable within the VD. The pigtail connectors are also color coded for ease of use. See the photo above.

In order to function, the Main Power of the VD must be on, the momentary switch on the VD for the recorder power must be on, and the Circuit Breaker inside the VD must also be switched on. Installment and rearrangement of the video recorders 1-4 requires the user to turn off the Circuit Breaker in the VD.

2.2 Manual Operations on the Recorders

2.2.1 Access to the recorders

If needed, the four recorders can be operated manually. Access is gained by opening the VD and sliding back the cover. As seen in Figure 24, the recorders are assigned permanent positions within the drawer. It is important to note which type of recorder is assigned to which position number.

To access the controls, the recorder screen is lifted up after pushing in the front latch. When the cover is open, the recorder's monitor screen is visible under the cover, as are the function buttons, the self-ejecting video cassette cover along with the eject button.

2.2.2 Installing a cassette

The SONY DSR-V10 uses small digital tapes of 40 minutes each. The SONY GVA500 uses larger, Hi-8 cassettes, which are for 240 minutes each. Affirm that the recorder power is ON, next open the VD, slide back the cover, open the recorder cover, and push the eject button. Take out the old cassette and label it. Slide in a new cassette. Push to close. It is ready to begin recording.

2.2.3 Operating the recorders

There are several ways to operate the video recorder, (although the focus is manual in this section):

1. remotely via the software provided for use with the GUI. This software has identical features to those on the recorder and both can be used to control the video recorder.
2. remotely via the RS422 line to the RC.
3. directly via the local recorder unit, as shown below.

The cassette recorder buttons are: **Record (two buttons the user must push simultaneously), Slow, Pause, Play, Rewind, Fast Forward and Stop.**

Other control panel buttons consist of: an **ON/OFF switch (must be On when installed), plus Auto Repeat, Menu, Select/Push Execute, LCD Brightness, Volume and Eject.**

Additionally, there are four extra buttons on the video recorder that the crew is advised never to use: **Display, Audio Dub, TC Reset and Rec Org. TC.**

Figure 27: Recorder Buttons



2.3 Manual Operations on the Cameras

There are no manual operations on the camera, because after it is attached, it is fully controlled via the GUI.

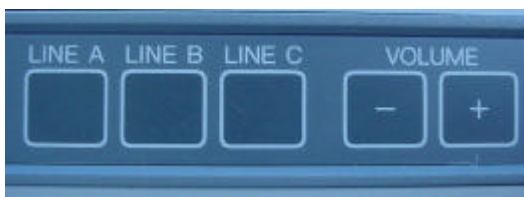
2.4 Manual Operations on the Monitors

When the monitor is powered, the LED on the front will be green. The SONY LMD 1040 monitors have a touch panel along the top edge of the screen. Most buttons will not be used except for the five right buttons. A list follows in Table 2.

Figure 28: Monitor Buttons



(left side)



(right side)

The buttons Line A, Line B and Line C reflect which input comes to the monitor and this may be regulated by the user. Pressing any of these buttons will momentarily reflect on the screen which Line is used. When displaying images on the monitor, Line A is used. Line B is not used and will reflect a blank screen. Line C is for the GUI

Table 2: Monitor Buttons Description

Name	Description of Use	Recommendation
Index	Shows the index number of the unit. You can assign an index number to each unit. When two or more units are installed at the same location, use this index number to select a unit you want to control using the remote commander.	This button is not applicable for MSG Video Drawer use.
U Scan	(under scan) Switches the size and viewable area of the image.	
	Adjusting parameter buttons	
V Pos	Vertical Position - This adjusts the picture position in the vertical direction for the computer signal.	
H PH	Corrects the jitter, unclear characters and color bleeding caused by the horizontal phase difference for the computer signal.	
H Size	Adjusts the picture size in the horizontal direction for the computer signal	
H Pos	Horizontal position - Adjusts the picture position in the horizontal direction for the computer signal.	
SHARP	Adjusts the picture sharpness for the Line A, Line B or Line C (YUV) signal.	

Color	Adjusts the color density for the Line A, Line B or Line C (YUV) signal.	
H	Adjusts the hue for the Line A, Line B or Line C (YUV) signal. Works with NTSC video signal only.	
PIC	Adjusts the picture contrast for all signals.	
Light	Adjusts the brightness of the screen. (The LCD angle against field of view does not change.)	
BRT	Adjusts the brightness of the screen (backlight). (The LCD angle against field of view does not change.)	
+/-	Adjust the selected parameter	
Signal input		
Line A	Selects the video/audio signal input through the Line A connectors	Images
Line B	Selects the video/audio signal input through the Line B connectors	Not applicable for MSG Video Drawer.
Line C	Selects the video/audio signal input through the LINE C connectors. Each time you press the button, the RGB signal mode and YUV (Y/B-Y/R-Y) signal mode switches. In the RGB signal mode, the computer mode or the VIDEO RGB mode switches automatically depending on the input signal	GUI

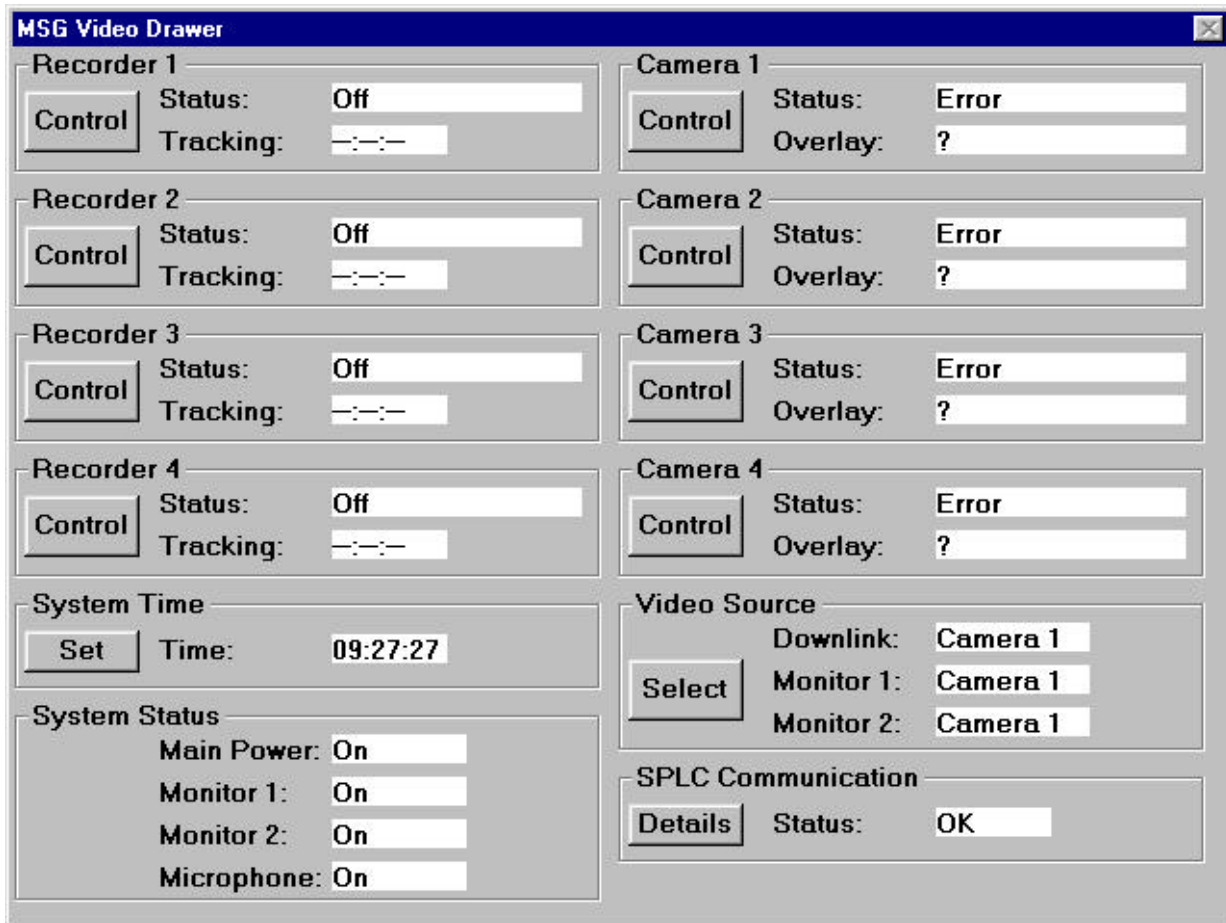
2.5 Operations via the Graphical User Interface (GUI)

In this section we will describe the software screens (GUI) seen via the monitors. The intent of the VD user interface is to provide crew with an easy-to-operate command and status device. The VD user interface has a Main Panel (screen) and several sub-panels. Using the VD user interface, settings and power for the cameras, recorders and settings for the user to choose what images are displayed through the Video Source Screen. An overview of data traffic between the VD and the RC on the SPLC Screen can also be monitored.

2.5.1 The Main Panel

The VD Software Main Panel is intended as the starting point for all actions. Because it is not easy to operate the touch-pad in a micro-gravity environment and having gloves on, the number of actions to activate a function has been reduced to a minimum. Most data on the recorders, cameras and is available in the main panel. The main panel comprises several buttons and status message lines. Each button, once pressed, initiates immediate action. Refer to Figure 29, below.

Figure 29: Main Panel Screen



Recorder 1		Camera 1	
Control	Status: Off	Control	Status: Error
	Tracking: --:--		Overlay: ?

Recorder 2		Camera 2	
Control	Status: Off	Control	Status: Error
	Tracking: --:--		Overlay: ?

Recorder 3		Camera 3	
Control	Status: Off	Control	Status: Error
	Tracking: --:--		Overlay: ?

Recorder 4		Camera 4	
Control	Status: Off	Control	Status: Error
	Tracking: --:--		Overlay: ?

System Time	
Set	Time: 09:27:27

System Status	
Main Power:	On
Monitor 1:	On
Monitor 2:	On
Microphone:	On

Video Source	
Select	Downlink: Camera 1
	Monitor 1: Camera 1
	Monitor 2: Camera 1

SPLC Communication	
Details	Status: OK

2.5.1.1 Recorder Control Buttons

There are several ways to operate the video recorder:

1. remotely via the software provided for use with the GUI. This software has identical features to those on the recorder and both can be used to control the video recorder.
2. remotely via the RS422 line to the RC.
3. directly via the local recorder unit..

Our focus in this section is on the GUI. As shown above, on the Main Panel screen in Figure 29, there are 4 Recorder Control buttons. The numbers reflect the four assigned positions within the VD.

Next to each Recorder Control button, there are two text lines. The first line shows the Status update received from the video recorder. All possible recorder status messages are in the table below.

Table 3: Recorder Status Messages

Text	Description
Off	Power is shut off. (All other messages indicate that the power is On.)
Not Found	No communication with recorder. This indicates that the recorder is not installed.
Stop	Recorder has stopped
Play	Recorder is reproducing from tape
Record	Recording on tape
Record Pause	Pause while recording
Play Pause	Pause during playback
Time-Lapse Record	Time-lapse active, record during time-lapse
Time-Lapse Pause	Pause during time-lapse
Forward	Fast forward
Rewind	Rewind
Search Forward	Fast forward, displaying playback screens
Search Rewind	Rewind, displaying playback screens

The second text line is the Tracking line which displays the tracking value received from the recorder. The format is HH:MM:SS, with HH: Hours, MM: Minutes, SS: Seconds. The default value is --:--:--, which indicates that no tracking value has been received. When the recorder's status is Off or Not Found, this default value is also displayed. Note that non-recorded tapes have no tracking information.

When the Recorder Control button is activated, the Recorder Control Panel will appear on the right side of the screen. Note that the relevant part of the screen that shows the recorder information will remain visible. The Status lines for the Recorder on the Main Panel Screen will still be updated.

2.5.1.2 Camera Control Buttons

On the right side of the Main Panel are 4 Camera Control buttons. Next to this button, two text lines are present: the first indicates the Status of that camera. Possible status messages for the cameras are:

Table 4: Camera Status Messages

Text	Description
Off	Power to recorder is off (All other messages indicate that power is ON)
On	Power is on and no errors have been detected
Not Found	No response from camera when last command was sent. This indicates that the camera is not installed.
Error	Bad response from camera when last command was sent.

The TEXT line shows the Overlay text that was last sent to the camera. If the camera has been turned off in the meanwhile, the display shows the question mark symbol, "?". If the automatic time overlay function was selected, the time is displayed here in the following format:

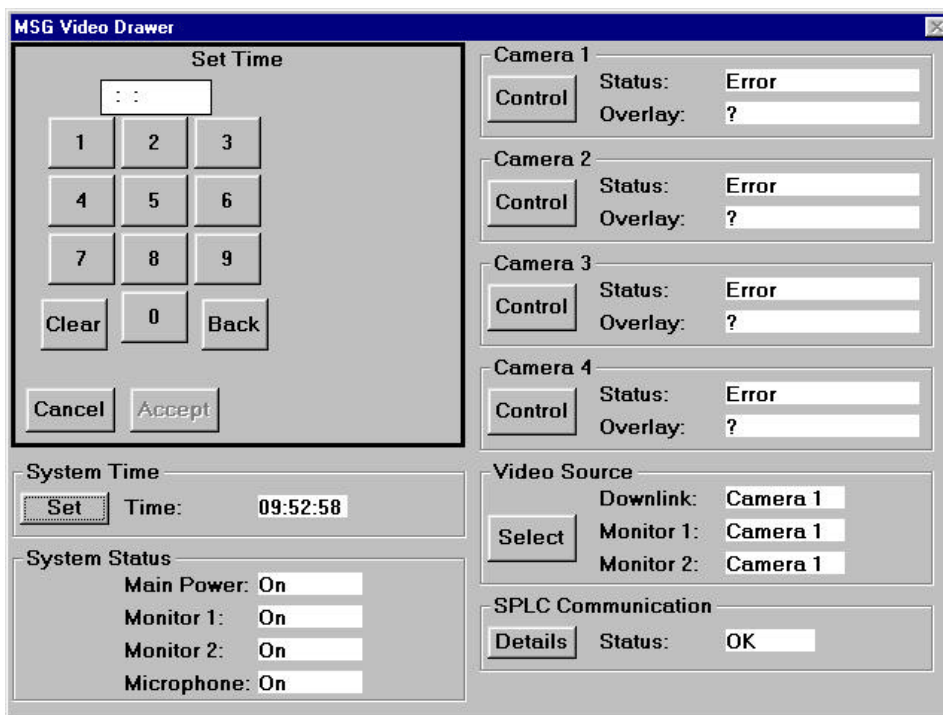
HH:MM, with HH: Hours, MM: Minutes. This same format is used on the camera.

The user should be aware that the latest overlay text that has been chosen and sent is shown here. This includes commands from the remote. It does not imply that the latest text is really visible on the camera: e.g., the camera could be turned off in the meantime, or switched to another position, or it could be that the overlay text position in the Camera Command Type menu was set to "OFF". We suggest that the user should always check the information selected by viewing on a monitor.

2.5.1.3 System Time

Also on the Main Panel is the System Time Set button. The System Time panel allows the adjustment of the time setting for the VD. The system time is presented in the HH:MM:SS format and the user must input all 6 spaces in order for the Accept button to become active (black). Every second this time is updated. This panel can be seen in the figure below. The system time has a battery back-up should the Circuit Breaker (power from rack) be switched off.

Figure 30: System Time



The screenshot shows the 'MSG Video Drawer' window. On the left, the 'Set Time' panel is active, featuring a numeric keypad (0-9), 'Clear', 'Back', 'Cancel', and 'Accept' buttons. Below this, the 'System Time' section shows a 'Set' button and a time display of '09:52:58'. The 'System Status' section lists 'Main Power: On', 'Monitor 1: On', 'Monitor 2: On', and 'Microphone: On'. On the right, the 'Camera' status for four cameras is shown, each with a 'Control' button, 'Status: Error', and 'Overlay: ?'. Below the cameras, the 'Video Source' section shows 'Downlink: Camera 1', 'Monitor 1: Camera 1', and 'Monitor 2: Camera 1'. At the bottom right, the 'SPLC Communication' section shows a 'Details' button and 'Status: OK'.

2.5.1.4 System Status

The System Status panel can also be seen in Figure 29: Main Panel Screen
This shows the status of four items:

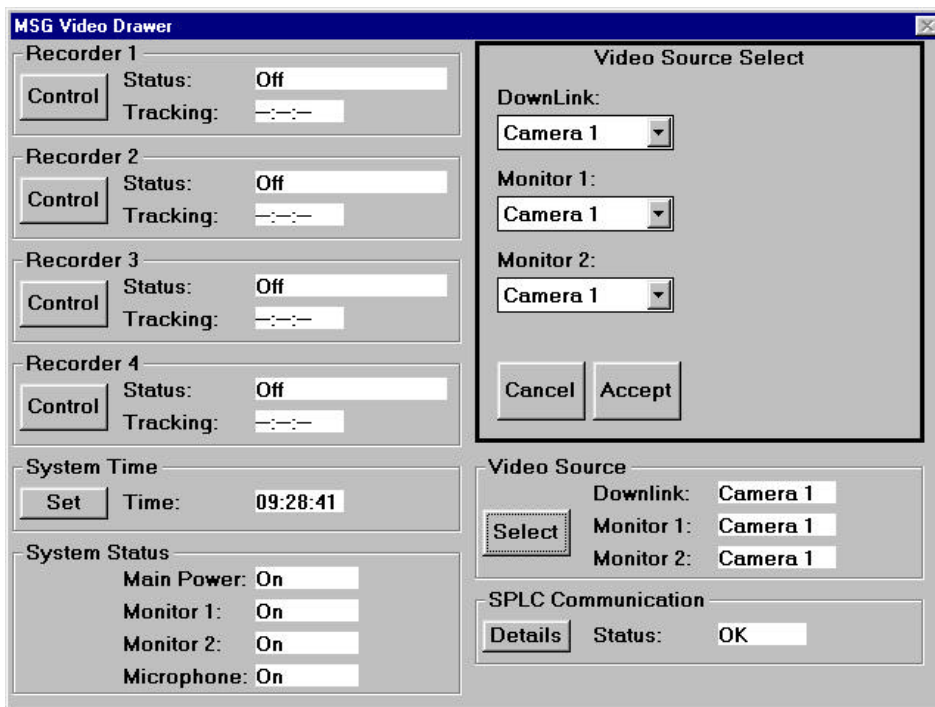
Table 5: System Status Messages

Main Power	On - Fully functional Stand-by - Power supply down to cameras, recorders and monitors.(Default) Overheat (OHD) - Power off until OHD sensor cools down.
Monitor 1	On or Off (default)
Monitor 2	On or Off (default)
Microphone	On or Off (default)

2.5.1.5 Video Source

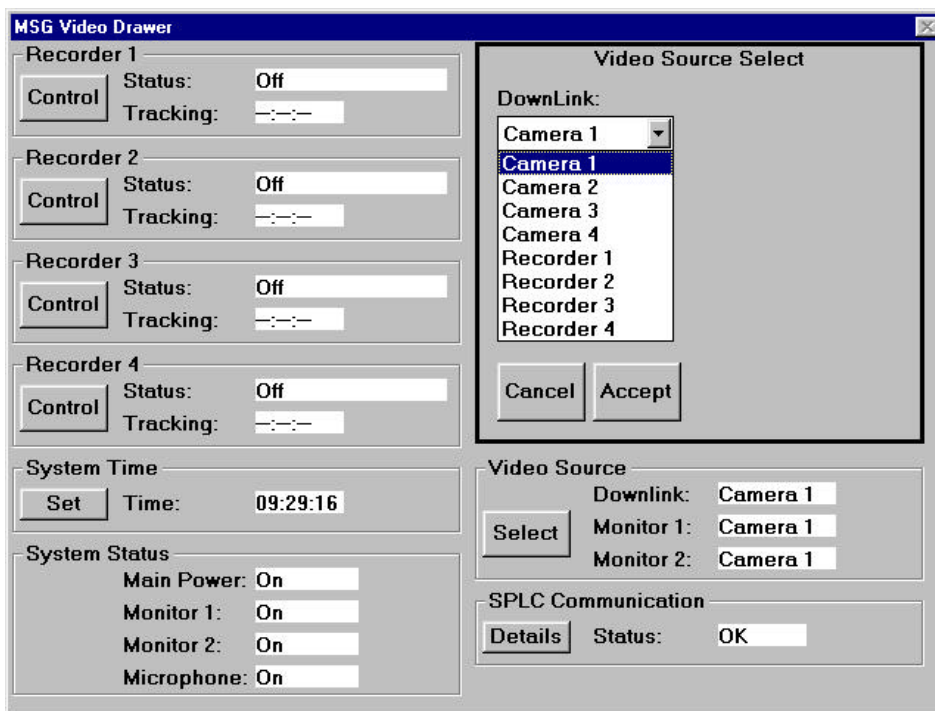
Using the Video Source Select button, the video-multiplexers can be set to the correct input source. The text status lines for the Downlink, Monitor 1 and Monitor 2 reflect the selected input. Pressing the Select button opens the subpanel.

Figure 31: Video Source Select Screen



The user can choose which input to send to the Downlink, Monitor 1 and Monitor 2 by clicking on the dropdown menu and highlighting the appropriate choice. Then the user presses Accept.

Figure 32: Video Source Select Dropdown Menu



2.5.1.6 SPLC Communication

The last panel we describe here on the Main Panel Menu is the SPLC Communication panel. In this panel, there is a Details button and a Status text box which may have any of the messages in the following table. By pressing the Details button, a detailed status of the VD is shown. (shown below in Figure 33: SPLC Status Details Screen)

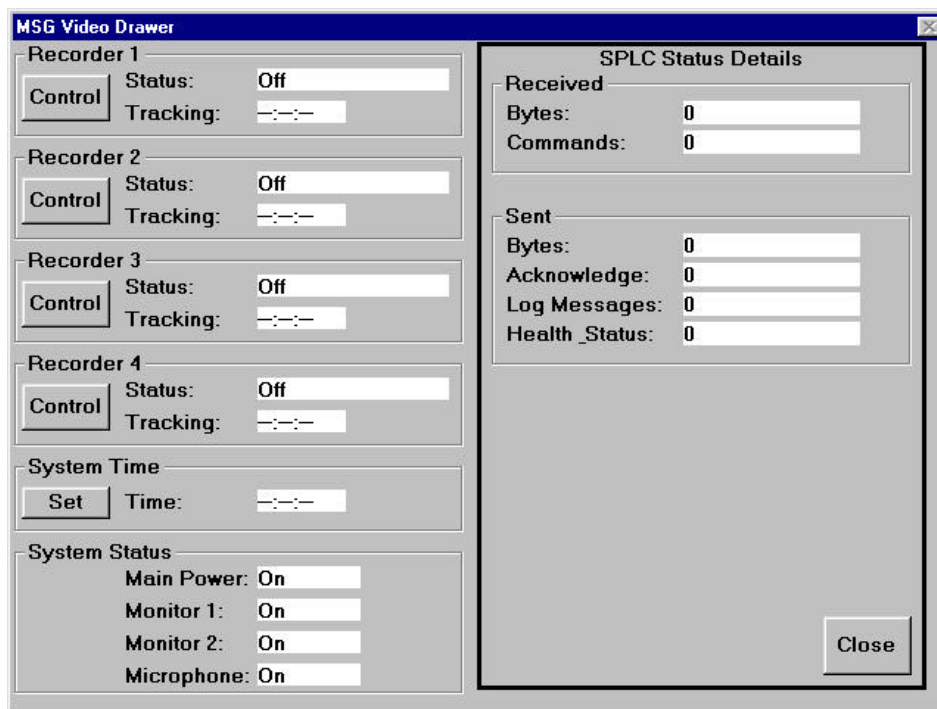
Table 6: SPLC Messages

Text	Description
OK	Default
Check	Error detected in communication. Since there is no corrective action possible, this "Check" message is cleared when the Details window is opened.

Table 7: SPLC Status Details Description

Received		Range (TBD)
Bytes:	Number of Bytes received from RC	
Commands:	Number of Commands received from RC	
Sent		
Bytes:	Number of Bytes sent to the RC	
Acknowledgements:	Acknowledgements to a well-received command	
Log Messages	Error Message to RC (Command receive error)	
Health _ Status	Number of Housekeeping Packets sent	

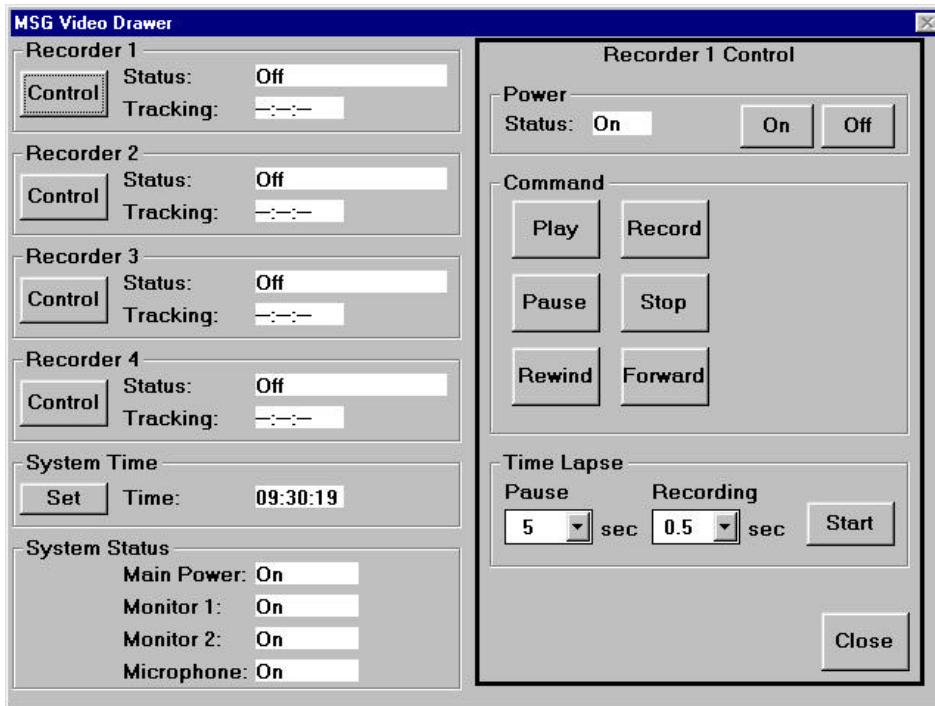
Figure 33: SPLC Status Details Screen



The screenshot shows the 'MSG Video Drawer' application window. On the left, there are four 'Recorder' sections (Recorder 1 to Recorder 4), each with a 'Control' button, a 'Status' dropdown (all set to 'Off'), and a 'Tracking' field. Below these is a 'System Time' section with a 'Set' button and a 'Time' field. At the bottom left is a 'System Status' section with 'Main Power', 'Monitor 1', 'Monitor 2', and 'Microphone' all set to 'On'. On the right, a 'SPLC Status Details' window is open, showing 'Received' and 'Sent' sections. The 'Received' section has 'Bytes' and 'Commands' both at 0. The 'Sent' section has 'Bytes', 'Acknowledge', 'Log Messages', and 'Health _ Status' all at 0. A 'Close' button is at the bottom right of the 'SPLC Status Details' window.

2.5.2 Recorders Control Panel

Figure 34: Recorder Control Panel Screen



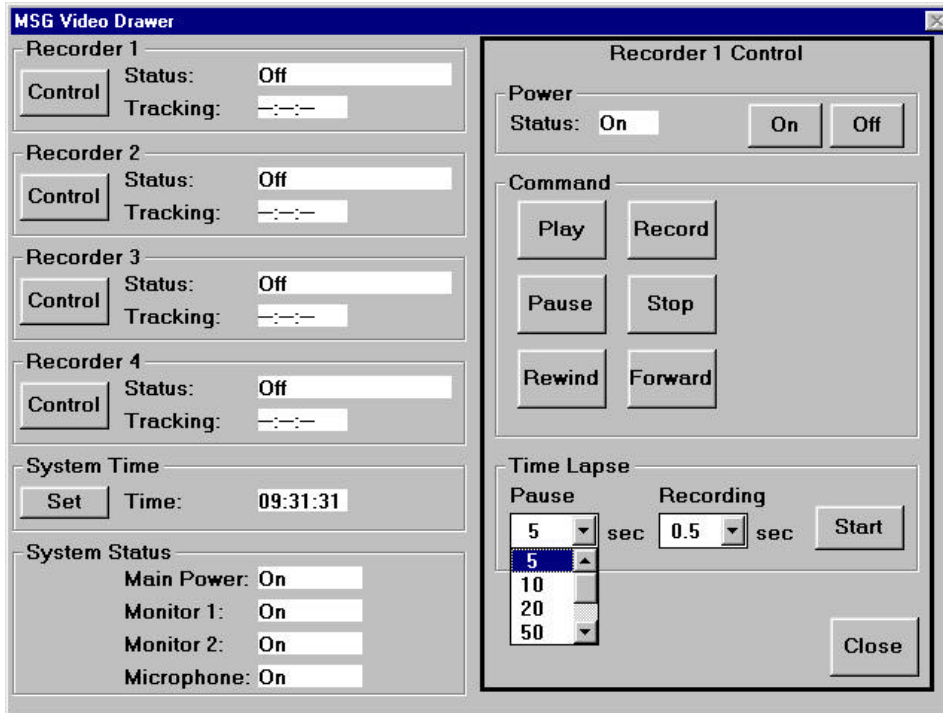
Pressing the Control button on the Recorder 1 Control panel allows the user to command the video to PLAY, RECORD, PAUSE, STOP, REWIND AND FAST FORWARD. In practice these buttons have the same function as the buttons on the recorder itself.

Table 8: Recorder Commands

Text	Description
Play	Sends Play command to recorder
Stop	Sends Stop command to recorder
Record	Sends Record command to recorder
Pause	Sends Pause command to recorder
Forward	Sends Forward command to recorder
Rewind	Sends Rewind command to recorder

The actual result of the function depends on the status of the recorder. Therefore the user should check the status to see if the function did what it was supposed to do.

Figure 35: Recorder 1 Control Time Lapse Panel Screen



The recorder Time Lapse Subpanel on the Camera Control Panel gives detailed commands to the Recorder about recording time intervals. The time-lapse settings have two variables that the user can choose in the S/W: length of recording and pause period. These times can be selected in the drop-down list for both settings. (If crew wants to use other selections than available on the GUI, it must confer with ground. The range for Pause time is 5 to 255 seconds (1 sec steps), and the range for Recording time is 0.5 to 25.5 seconds increasing in intervals of 1/10 a second).

For the user interface a selection is made in the drop-down menus:

Recording period: 0.5, 1.0, 2.0, 5.0 seconds

Pause period: 5, 10, 20, 50 seconds

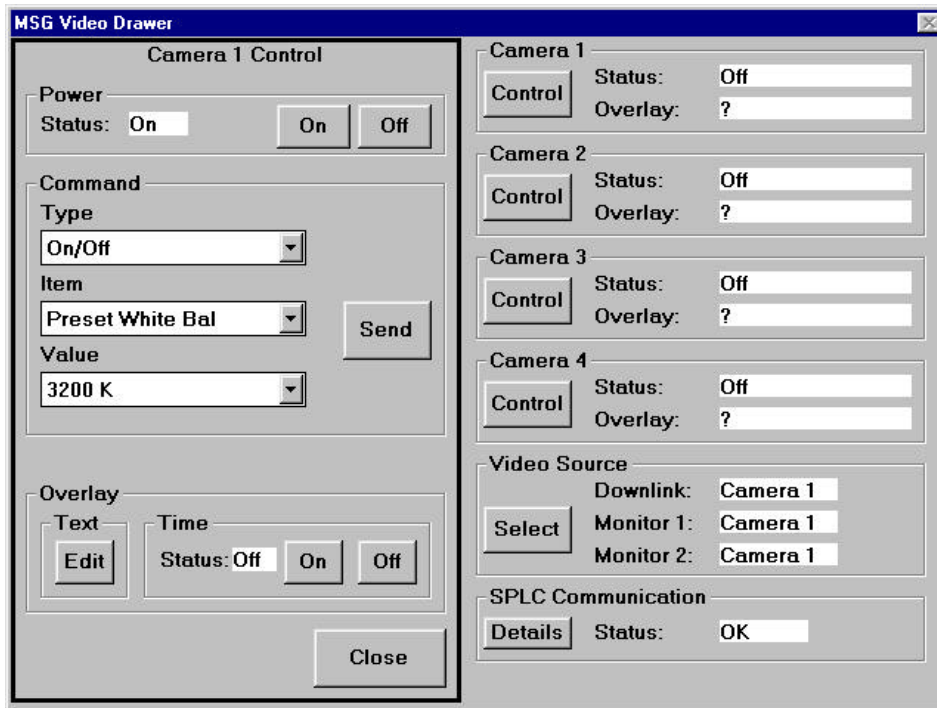
The 'Start Time-Lapse' button activates time-lapsing using the settings in the drop-down lists.

Note: Initialization of recording times is varied for the DSRV10 and the GVA-500 recorder. This means that when using the Time-Lapse feature and the GVA-500, the user must add two and one-half seconds to the desired recording period. Details are TBD.

The CLOSE button closes this panel.

2.5.3 Camera Control Panel

Figure 36: Camera Control Panel Screen



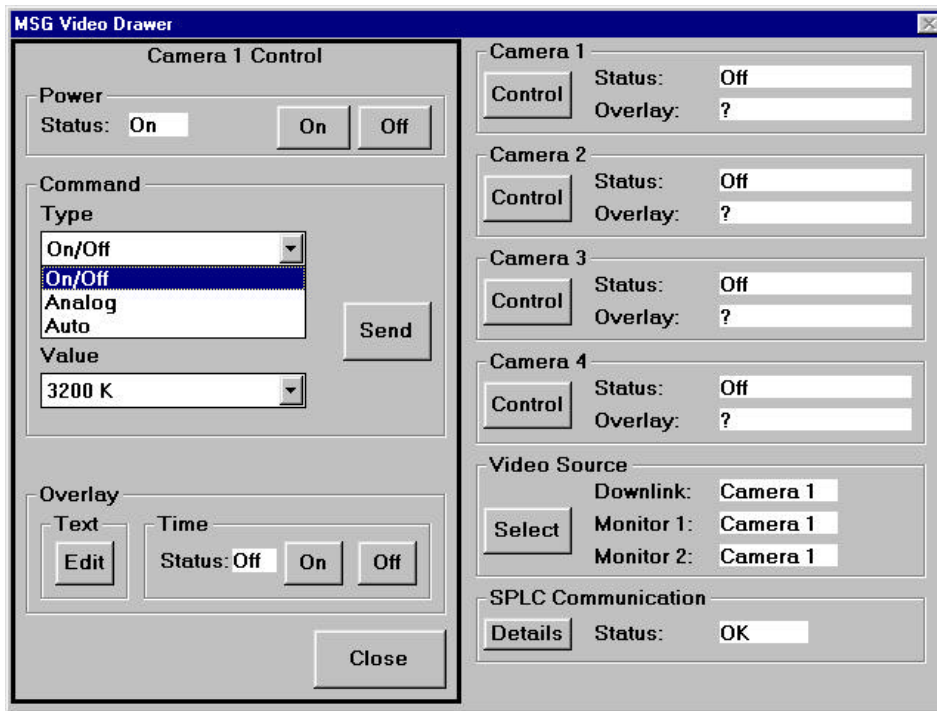
In the screen print above, the layout of the Camera 1 Control Panel is shown (same for each camera.) It contains subpanels with text and buttons for Power, Command and Overlay, as well as the Close button at the very bottom of the screen.

The Power Status of the camera is shown in the text line as On. (It can be Off.) This status line is the same as the Camera 1 On Led on the VD Front Panel. The On and Off buttons next to the status text line have the same function as the Momentary On/Off switch for Camera 1 on the VD Front Panel. Activating one of the buttons is the same as using the switch on the front panel with the same restrictions. Crew can use this button to turn the camera On or Off.

In the Command Subpanel are features that are settable on the camera. Three buttons and subselections must be chosen for each camera selected: Types, Item and Value. The Types button opens a drop down menu offering On/Off, Analog and Auto, in

Figure 37: Camera 1 Control Type Dropdown Menu Screen we can see the drop down Menu screen for Types.

Figure 37: Camera 1 Control Type Dropdown Menu Screen



The available options in the ITEM drop-down-lists reflect which Type the user selects. For example, when On/Off is the Type selected, the options in the ITEM list are as described in the following table. Press Send after selection. (A screen print of the drop down menu follows the table)

Table 9: Camera Type On/Off Items Description

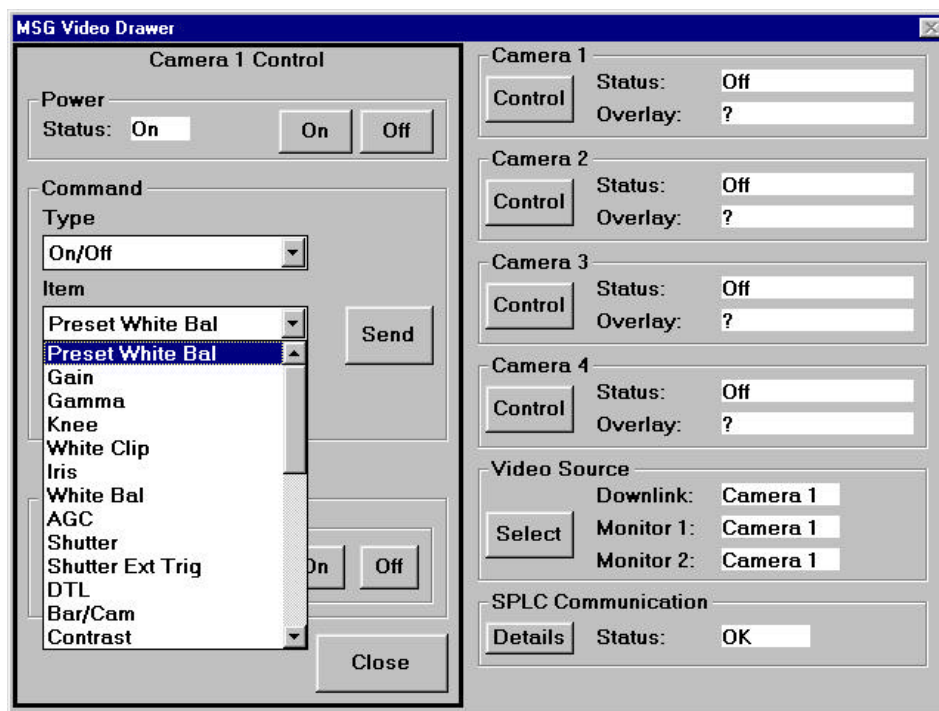
Preset White Balance	The same status as the white balance is controlled at 3200K or 5600K is established. A color temperature can be switched by the PRESET item on the next line.
Gain	Gain setting in 0 to 18 dB in 1dB steps (in the AGC:OFF mode) NORM mode. Gain is set to 0dB. HIGH mode. Gain is the value set by the HIGH on the next line. MAX mode. Gain is the value set by the NEXT on the next line.
Gamma	Gamma On/Off
Knee	On/Off. When ON is selected, the gradation of white portion becomes natural.
White Clip	On/Off.
Iris	Set the iris mode to Auto when an auto iris lens is

	used. Manual mode is when an auto iris is not used.
White Balance	Preset. Mem, or Auto. White Balance mode is to adjust the white balance when illumination conditions are changed. This can be done manually or automatically. This is useful for source color temperature changes in the lapse of time.
AGC	AGC On/Off ON mode. Gain is automatically controlled. The upper limit of gain is the value set by the LIMIT on the next line. OFF mode. Gain is fixed to the value set by the GAIN on the next line. Variable mode.
Shutter	The electronic shutter is switched on or off. Preset mode is 1/100, (1/60 PAL), 1/250, 1/500, 1/1000, 1/2000, 1/4000, and 1/10,000s Variable Mode: AES Mode: AES mode: Off to 1/1000s approx. (continuously variable in 1H steps up to value equivalent to lens stop 4.) Ext. Mode: see below
Shutter Ext Trig.	1 Trig: 2 Trig: Fix Trig. Ext Trig. Further settings can be made by the item on the next line. Lock Scan mode: NTSC 1/60.38 to 1/10,168s Long time integration mode: NTSC 1/30 to 1s (30 steps.) PAL 1/25 to 1s (25 steps.)
DTL	DTL amount control Select Off, low, norm or high.
Bar/Cam	Bar: Cam:
Contrast	Contrast on/off. When ON is selected, the contrast of dark portion is enhanced.
G On Sync	On/off switch. The sync signal is the RGB signals or the G signal is switched.
GL In Imp	Switching of impedance of genlock input signal. This can be 75 ohms or High.
ID	A unique identifier on the camera. For NASA to use this, a special cable from BE must be requested. This is superimposed on camera image on the top or

	bottom of the right side. This feature can be turned on or off.
Title	This is the Overlay of Text or Time that is superimposed on the left side top or bottom of the camera image. This feature can be turned on or off.
Open Limit	On/Off. Adjust the lens iris for the position where the lens iris opens fully, while observing the lens iris. In case picture quality becomes poor when the lens iris opens fully, this function is effective.
Close Limit	On/Off. Adjust the lens iris to a minimum, while observing the lens iris. (Must set AGC to off, Gain to Norm and Shutter to Off.)
Iris Gate DSP	On or Off.
Iris Gate Cont	Iris Gate menu is executed with On/Off. On mode- the AGC, lens iris and auto electronic shutter are controlled by detecting the video signal level at the set window section. As the window signal is superimposed on the video signal in the menu mode, the optimum window signal can be set by changing the size and position of the gate area, while observing the monitor. In the direct mode, the gate area is not displayed. Off mode- The AGC, lens iris and auto electronic shutter are controlled by detecting the video signal of the entire screen. The gate area is not set. Further, the window is not displayed.
Lens Type	Setting of kind of auto iris. Select DC mode if an auto iris is not used. Video mode is used when a lens whose iris is controlled by the video signal is used.
Shad Mode	Automatic shading correction COLOR mode- Unevenness of the color at the upper and lower parts of the screen becomes minimum. Application: Normal lens. LUMIN mode - Each signal level of the RGB signals at the upper and lower parts of the screen becomes equal. Application: Microscope.
Fld/Frm	Fld or Frm
Iris Gate Pattern	1 or 2 or 3
Iris Gate H Position	Left 1-10, Right 1-5 and Down

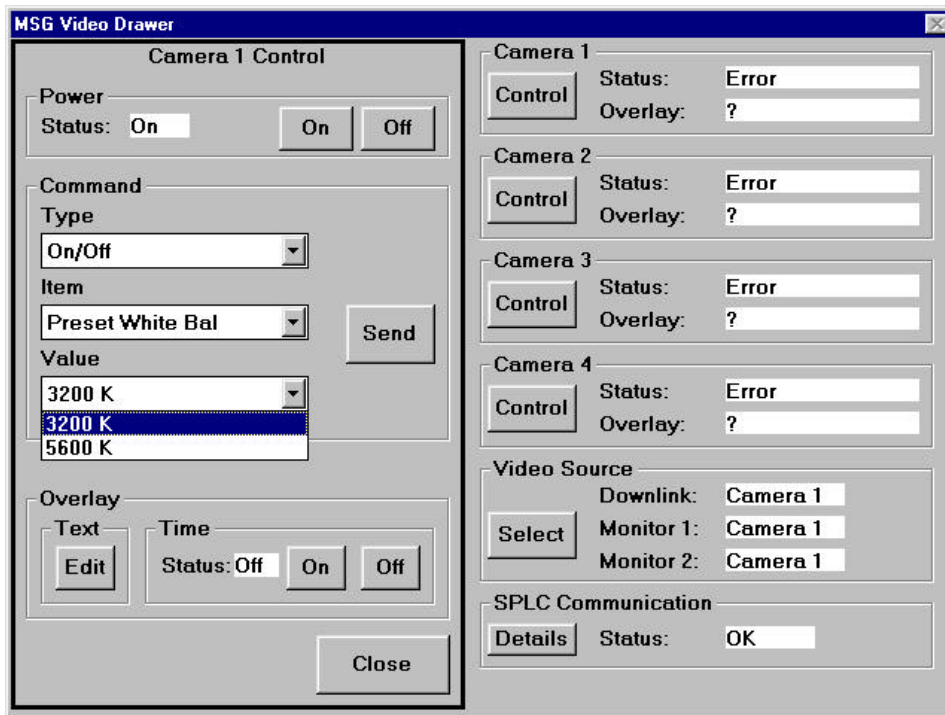
Gain High	See Gain Above and from +1 to +17
Gain Max	See Gain Above +2 to +17
AGC Limit	See AGC Above +6 to +12
ALC (Automatic Level Control)	3 kinds of the ALC functions are available by the combination of the AGC:ON mode, SHUTTER: AES mode and auto iris. Therefore, a stable video output signal is available for the wide change in quantity of light. Note1. AES not avail to video lens. 2. When auto iris lens isn't used, set iris to manual using lens menu.

Figure 39: Camera Command Type On/Off Dropdown Menu Screen



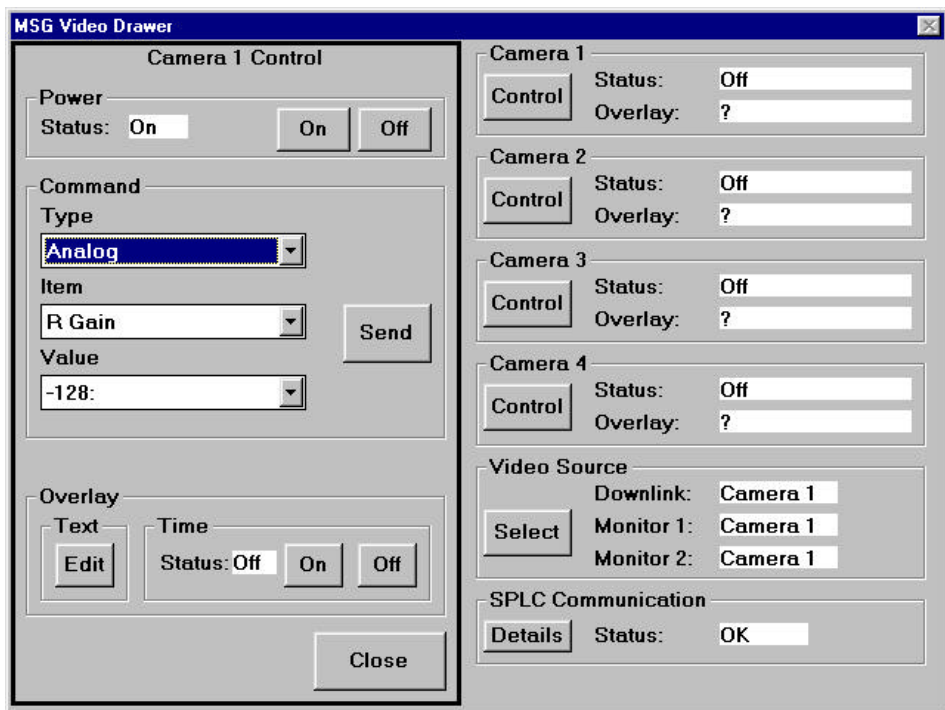
Note: The Dropdown Menu is longer than depicted in the above screenprint.

Figure 40: Command Value Dropdown Menu



The screenshot shows the 'MSG Video Drawer' window. On the left, the 'Camera 1 Control' panel has a 'Power' section with 'Status: On' and 'On/Off' buttons. Below is a 'Command' section with 'Type' set to 'On/Off', 'Item' set to 'Preset White Bal', and a 'Value' dropdown menu showing '3200 K' (highlighted) and '5600 K'. There is an 'Overlay' section with 'Text' and 'Time' options, each with an 'Edit' button and a 'Status' (Off/On/Off). A 'Send' button is to the right of the 'Item' dropdown. At the bottom right of the panel is a 'Close' button. On the right side of the window, there are four camera status panels (Camera 1 to Camera 4), each with a 'Control' button, 'Status' (Error), and 'Overlay' (?). Below these is a 'Video Source' section with 'Downlink', 'Monitor 1', and 'Monitor 2' all set to 'Camera 1'. At the bottom is an 'SPLC Communication' section with a 'Details' button and 'Status: OK'.

Figure 41: Camera Command Type Analog Screen

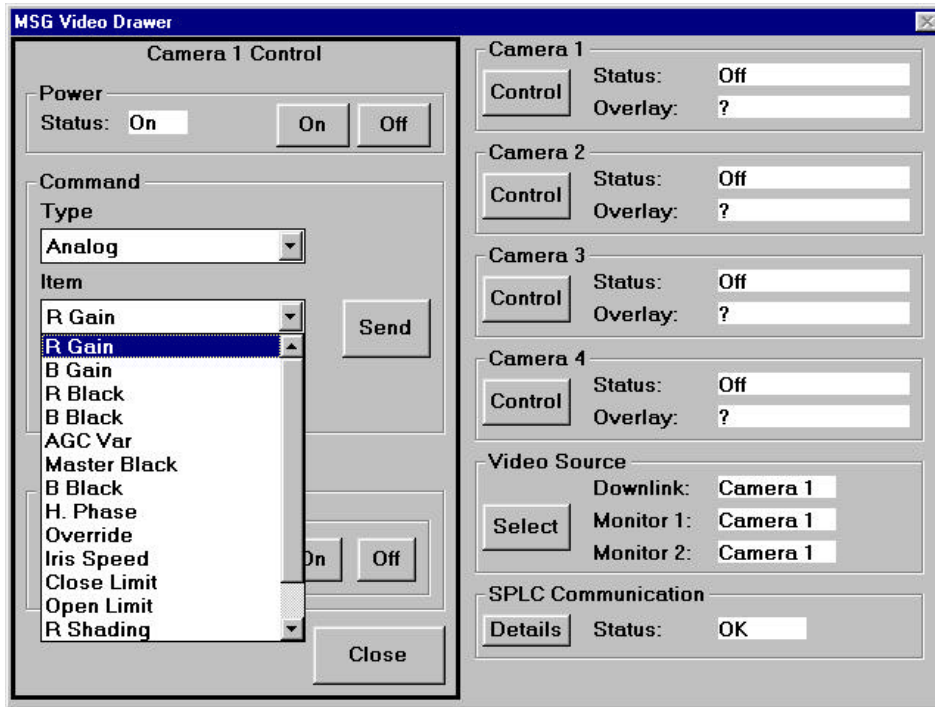


This screenshot is similar to Figure 40 but with the 'Type' dropdown set to 'Analog'. The 'Value' dropdown now shows '-128:'. The 'Status' for all cameras (1-4) is now 'Off' instead of 'Error'. The 'SPLC Communication' status remains 'OK'.

When Analog is chosen in the Type dropdown menu, the options are identical to the Hitachi Technical

Information on the remote control capabilities of the HV-C20 camera as listed.

Figure 42: Camera Command Type Analog Item Dropdown Menu Screen

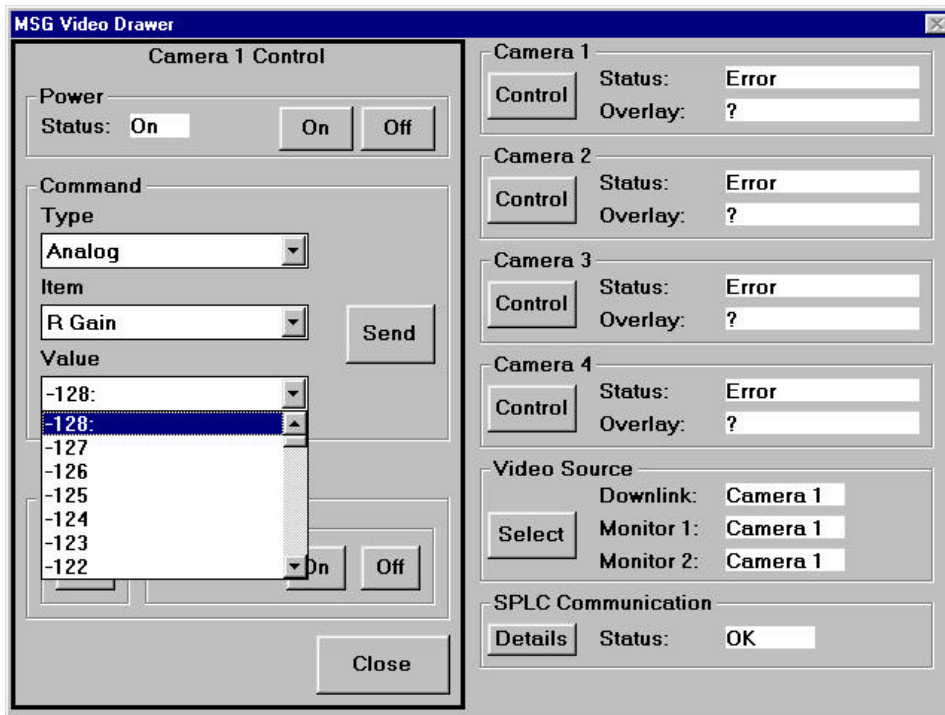


The screenshot shows the 'MSG Video Drawer' application window. On the left, the 'Camera 1 Control' panel is active. It features a 'Power' section with a 'Status: On' indicator and 'On'/'Off' buttons. Below this is a 'Command Type' dropdown menu set to 'Analog'. The 'Item' dropdown menu is open, displaying a list of commands: R Gain, B Gain, R Black, B Black, AGC Var, Master Black, B Black, H. Phase, Override, Iris Speed, Close Limit, Open Limit, and R Shading. A 'Send' button is located to the right of the 'Item' list. At the bottom of the panel are 'On', 'Off', and 'Close' buttons. On the right side of the window, there are four camera status sections (Camera 1 to Camera 4), each with a 'Control' button, 'Status' (all set to 'Off'), and 'Overlay' (all set to '?') fields. Below these is a 'Video Source' section with a 'Select' button and fields for 'Downlink' (Camera 1), 'Monitor 1' (Camera 1), and 'Monitor 2' (Camera 1). At the bottom right is an 'SPLC Communication' section with a 'Details' button and a 'Status: OK' indicator.

Note that the dropdown menu is longer than it appears above in the figure. The value menu is briefly hidden under the Item Menu, but is shown opened, below.

After all selections are made and visible in the text bar, the SEND button must be pressed to send the information to the camera position chosen.

Figure 43: Camera Control Command Type Analog Item R Gain Value Dropdown Menu

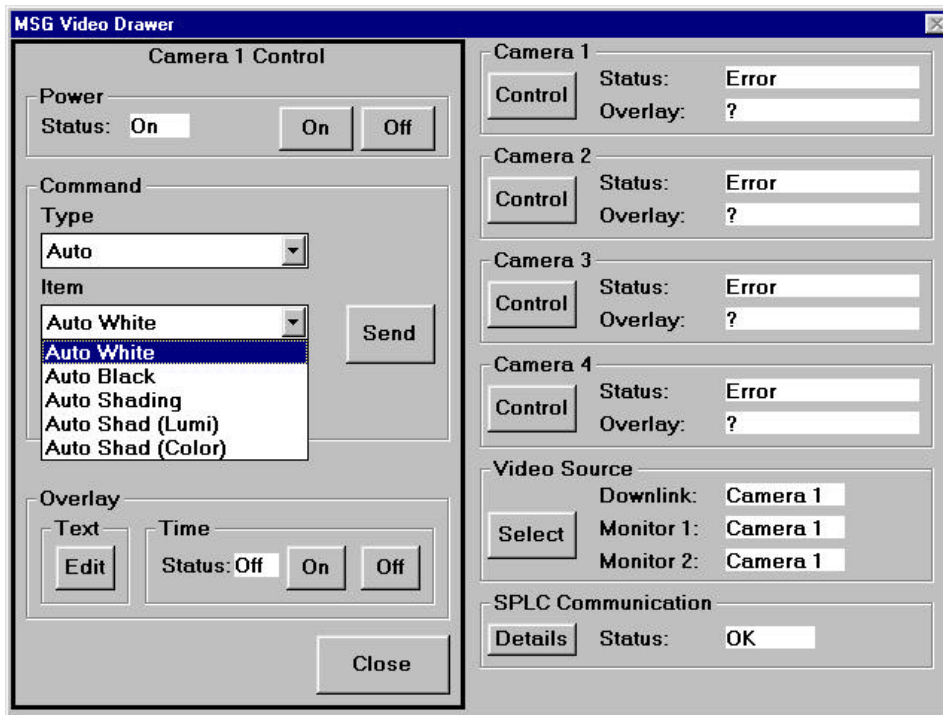


When the Type Auto is chosen, the available options under ITEM change according to the following table.

Table 10: Camera Type Auto Items Description

Auto White
Auto Black
Auto Shading
Auto Shad (Lumi)
Auto Shad (Color)

Figure 44: Type Auto Dropdown Menu



2.5.3.1 Overlay for Camera

At the bottom of the Camera 1 Command panel the **Overlay** is found. This feature gives the crew the opportunity to place information (up to 12 characters) onto the left foreground of a camera's view position in order to describe an experiment. In order to turn this feature on and off, or to switch from top to bottom left of the screen, the Camera Control Menus must be used. Choose Command, Type On/Off, Item Title.

Table 11: On/Off Title Position Drop Down List

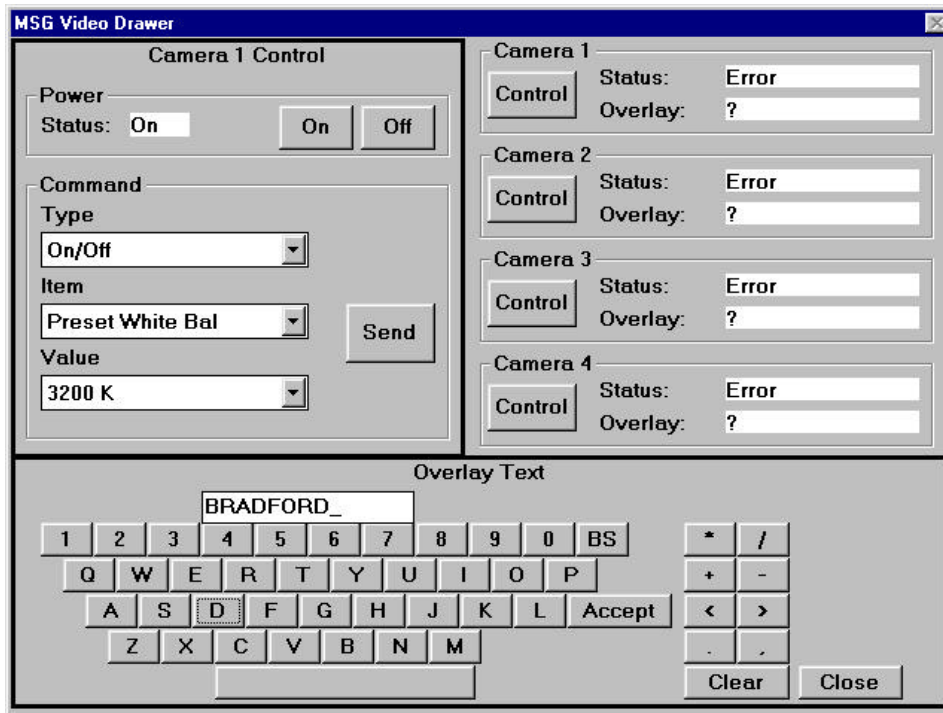
Text	Description
Top	Overlay text located at the top of the screen
Bottom	Overlay text located at the bottom of the screen
Off	Overlay text not displayed

2.5.3.1.1 Overlay text keyboard

From the Camera Control Panel, the Overlay Text button opens the overlay text keyboard panel. The keyboard allows a length of 12 characters total on the display screen. The overlay text (max 12 letters, numbers and symbols) is always positioned on the left side of the screen, at the top or bottom position.

The Overlay Text button activates the Overlay Panel (see below). The **Close** button closes this panel.

Figure 45: Overlay Text Panel Keyboard



Any of the 12 text positions not filled in will be subsequently filled in automatically by the S/W with blank spaces. This does not occur when this information is filled in via remote station or ground control. If one attempts to add extra characters, they will be ignored. The **BS** key (BACKSPACE) allows deleting of characters.

Press the Overlay Text Edit button. The user will place the descriptive information about the experiment being performed, such as the title or subject, in the correct order. The Accept button is pressed to send the information to the camera.

2.5.3.1.2 Automatic Time Overlay

Instead of or in addition to descriptive text, the time can automatically be placed on the image foreground with this Overlay Panel. On the Main Panel (see Figure 29: Main Panel Screen

Overlay Time Status On initiates the automatic time overlay capability. The moment the "On" button is pressed it sends the information to the camera. The Time Overlay Off button stops this automatic update. The time is displayed in the format: HH:MM.

Note this feature is allocated a portion of the 12 text spaces mentioned in the Overlay Text heading above,